DETAILED ACTION

Reasons for Allowance

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ms. Norma Henderson (Reg. No. 39,219) on November 17, 2010.

2. The application has been amended as follows:

Cancel claims 6-10.

1. (Currently Amended) [A method for generating a nucleic acid molecule with precise user control, the method comprising:

a) providing a plurality of nucleic acids immobilized on a surface;

b) providing a nucleic acid molecule attached to a protecting group;

c) contacting said immobilized nucleic acid molecule with said nucleic acid molecule attached to a protecting group;

d) elongating said immobilized nucleic acid molecule; and

e) dissociating said immobilized nucleic acid molecule from said protecting group thereby extending said immobilized nucleic acid molecule]. A method for determining whether a nucleotide or an oligonucleotide is added to a nucleic acid, the method comprising:

a) providing a solid support having an immobilized nucleic acid;

b) performing a nucleic acid addition reaction by adding a nucleotide or an oligonucleotide to the nucleic acid immobilized on the solid support to synthesize a nucleic acid molecule on the solid support;

c) after the nucleic acid addition reaction, passing the solid support through a channel opening with at least one detector, wherein the at least one detector detects the length of a nucleic acid;

d) determining whether the nucleotide or the oligonucleotide is added to the nucleic acid immobilized on the solid support using the at least one detector, wherein an increase in length of the nucleic acid molecule on the solid support indicates that the nucleotide or the oligonucleotide is added to the nucleic acid immobilized on the solid support; and

e) repeating steps b) through d) if the nucleotide or the oligonucleotide is not added to the nucleic acid immobilized on the solid support.

2. (Currently Amended) The method of Claim 1, wherein [said protecting group comprises proteins, carbohydrates; diphosphates, phosphate derivatives, nucleotides, oligonucleotides, or combinations thereof] the solid support is a bead or particle and further comprising the step of detecting whether there is an increase in electrophoretic force applied to the solid support when an electric field and an magnetic field gradient are applied to the solid support, wherein the increase in electrophoretic force applied to the solid support is caused by adding the nucleotide or the oligonucleotide to the nucleic acid immobilized on the solid support.

3. (Currently Amended) [The method of Claim 1, wherein the removal of said protecting group is accomplished by the application of heat, proteases, phosphotases, restriction enzymes, or combinations thereof] The method of claim 14, wherein the errors in the sequence of the

nucleic acid molecule are selected from the group consisting of insertion errors, deletion errors, and wrong base incorporation errors.

4. (Currently Amended) A method for [removing or controlling errors in] determining whether a nucleotide or an oligonucleotide is added to a nucleic acid [molecules comprising arbitrary user-specified sequence composition and length], the method comprising:

a) providing a solid support [for synthesis of] having an immobilized nucleic acid;

b) [synthesizing a nucleic acid attached to the solid support] performing a nucleic acid addition reaction by adding a nucleotide having a fluorescent 5' protecting group or an oligonucleotide having a fluorescent 5' protecting group to the nucleic acid immobilized on the solid support to synthesize a nucleic acid molecule having a fluorescent 5' protecting group on the solid support;

c) after the nucleic acid addition reaction, passing the solid support [and the synthesized nucleic acid] through a channel opening with at least one detector, wherein the at least one detector detects florescent signals;

d) [detecting,] determining whether the nucleotide having a fluorescent 5' protecting group or the oligonucleotide having a fluorescent 5' protecting group is added to the nucleic acid immobilized on the solid support using the at least one detector, wherein the presence of the nucleic acid molecule having a fluorescent 5' protecting group on the solid support indicates that the nucleotide having a fluorescent 5' protecting group or the oligonucleotide having a fluorescent 5' protecting group is added to the nucleic acid immobilized on the solid support [errors in the sequence of the synthesized nucleic acid]; and

e) repeating steps b) through d) if the nucleotide having a fluorescent 5' protecting group or the oligonucleotide having a fluorescent 5' protecting group is not added to the nucleic acid immobilized on the solid support [correcting the errors in the sequence of the synthesized nucleic acid].

5. (Currently Amended) A method for [removing or controlling] preventing errors in a nucleic acid molecule [molecules comprising arbitrary user-specified sequence composition and length], the method comprising:

a) synthesizing a nucleic acid molecule [by addition of a nucleotide or oligonucleotide] having a 5' protecting group by adding a nucleotide having a 5' protecting group or an oligonucleotide having a 5' protecting group to a nucleic acid;

b) [preventing deletion errors in the sequence of the synthesized nucleic acid by the steps of:] deprotecting the [synthesized] nucleic acid molecule by washing the nucleic acid molecule using a deprotection wash to remove the 5' protecting group of the nucleic acid molecule, and producing an after-washing solution;

c) flowing the [deprotection wash and the removed 5' protecting group] after-washing solution through a channel opening[;] and monitoring [the flowed wash] the after-wash solution through the channel opening for the presence of [the] a removed 5' protecting group[, comprising recycling the flowed wash until the presence of the removed 5'protecting group is detected in the wash]; and

[c] d) repeating [steps a) and b)] steps b) and c) if the removed 5' protecting group is not detected in the after-washing solution through the channel opening or adding a nucleotide having a 5' protecting group or an oligonucleotide having a 5' protecting group to the nucleic acid

molecule if the removed 5' protecting group is detected in the after-washing solution through the channel opening, thereby preventing errors in the sequence of the nucleic acid molecule [until the sequence of the synthesized nucleic acid comprises the user-specified sequence composition and length].

12. (Currently Amended) The method of claim 4, wherein the solid support is a bead or particle and further comprising the step of detecting whether there is an increase in electrophoretic force [exerted by the synthesized nucleic acid on] applied to the solid support when an electric field and an magnetic field gradient are applied to the solid support, wherein the increase in electrophoretic force applied to the solid support is caused by [the growth of the synthesized nucleic acid] adding the nucleotide or the oligonucleotide to the nucleic acid immobilized on the solid support.

13. (Currently Amended) The method of claim 5, wherein [steps (a)-(c)] the 5' protecting group of the nucleic acid molecule is a fluorescent 5' protecting group and said monitoring step are carried out using a plurality of light sources and fluorescent detectors.

14. (Currently Amended) The method of claim 4, [the synthesized nucleic acid comprising at least an added nucleotide or oligonucleotide with a 5' protecting group and the method] further comprising the steps of:

[(f) at any point after step b), preventing deletion errors in the sequence of the synthesized nucleic acid by the steps of:]

if step d) indicates the presence of the nucleic acid molecule having a fluorescent 5' protecting group on the solid support, deprotecting the [synthesized] nucleic acid molecule by

washing the nucleic acid molecule using a deprotection wash to remove the fluorescent 5' protecting group of the nucleic acid molecule, and producing an after-washing solution;

flowing the [deprotection wash and the any removed 5' protecting group] after-washing solution through a channel opening;

monitoring the [flowed wash] after-washing solution through the channel opening for the presence of [the] a removed 5' protecting group[, comprising recycling the flowed wash until the presence of the removed 5' protecting group is detected in the wash]; and

repeating [at least] the deprotecting, flowing, and monitoring steps if the removed 5' protecting group is not detected in the after-washing solution through the channel opening or adding a nucleotide having a 5' protecting group or an oligonucleotide having a 5' protecting group to the nucleic acid molecule on the solid support if the removed 5' protecting group is detected in the after-washing solution through the channel opening, thereby preventing errors in the sequence of the nucleic acid molecule [of synthesizing and preventing until the sequence of the synthesized nucleic acid comprises the user-specified sequence composition and length].

15. (Currently Amended) The method of claim 14, wherein the solid support is a bead or particle and further comprising the step of detecting whether there is an increase in electrophoretic force [exerted by the synthesized nucleic acid on] applied to the solid support when an electric field and an magnetic field gradient are applied to the solid support, wherein the increase in electrophoretic force applied to the solid support is caused by [the growth of the synthesized nucleic acid] adding the nucleotide or the oligonucleotide to the nucleic acid immobilized on the solid support.

16. (Currently Amended) The method of claim [4] 14, wherein [steps (a)-(c)] said monitoring step are carried out using a plurality of light sources and fluorescent detectors.

17. (Currently Amended) The method of claim [4] 5 wherein the errors in the sequence of the [synthesized] nucleic acid molecule are selected from the group consisting of insertion errors, deletion errors, and wrong base incorporation errors.

3. The following is an examiner's statement of reasons for allowance:

Claims 1-5 and 12-17 are allowable in light of applicant's amendment filed on May 10, 2010 and the examiner's amendment. The rejections under 35 U.S.C 112, first and second paragraphs have been withdrawn in view of the applicant's amendment and the examiner's amendment (the support can be found in paragraphs [0029] and [0135] of US 2005/0227235 A1 which is US publication of this instant application). The closest prior art in the record is Gascoyne *et al.,* (US 2003/0171325, filed on September 11, 2003) and Bass *et al.,* (US Patent No. 6,939,673 B2, filed on June 14, 2002). These prior arts do not teach or suggest step c) of claims 1 and 4 and steps c) and d) in claim 5. These prior arts either alone or in combination with the other art in the record does/do not teach or reasonably suggest a method for determining whether a nucleotide or an oligonucleotide is added to a nucleic acid and a method for preventing errors in a nucleic acid molecule which comprise all limitations recited in claims 1, 4, and 5.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

4. Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CAR § 1.6(d)). The CM Fax Center number is (571)273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Lu, Ph.D., whose telephone number is (571)272-0746. The examiner can normally be reached on Monday-Friday from 9 A.M. to 5 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Nguyen, can be reached on (571)272-0731.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Frank W Lu /
Primary Examiner, Art Unit 1634
November 17, 2010